UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,477	01/15/2004	Young Dae Kim	YHK-0131	4151

34610 7590 12/27/2007

KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, VA 20153-1200

EXAMINER	
BODDIE, WILLIAM	
ART UNIT	**PAPER NUMBER**
2629	

MAIL DATE	DELIVERY MODE
12/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/757,477	KIM, YOUNG DAE
	Examiner	**Art Unit**
	William L. Boddie	2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10,12-14,16,18 and 21-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10,12-14,16,18 and 21-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. In an amendment dated, August 9th, 2007, the Applicant amended claims 1, 5-8, 10, 12, 14, 16, 18, 22, 25 added new claims 26-31 and cancelled claims 9, 11, 15, 17 and 19-20. Currently claims 1-8, 10, 12-14, 16, 18 and 21-31 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 3rd, 2007 has been entered.

Response to Arguments

3. Applicant's arguments filed August 9th, 2007 have been fully considered but they are not persuasive.

On pages 14-15, the Applicants traverse the rejections of claims 1, 12 and 21. Specifically the Applicants argue that none of the prior art discloses applying the specific waveforms of the claims in different sub-fields of the same frame during initialization, and as such are allowable.

The Examiner must respectfully disagree. Simply because there is not a single reference which teaches the exact waveforms as claimed this does not inherently mean the claims are allowable. 35 USC § 103 allows for combinations of pieces of prior art

that would have been obvious at the time of the invention to those of ordinary skill in the art.

Furthermore, as has been clearly detailed in previous office actions and during interviews, Sakita quite clearly discloses applying different waveforms during initialization for different sub-fields within the same frame (figs. 31-33). It would seem obvious when presented with the waveforms, disclosed as prior art by the Applicants themselves, that one of ordinary skill in the art would replace the two different initialization waveforms taught by Sakita with the two different initialization waveforms disclosed as prior art. As detailed in the rejections, the combination of Sakita with APA is seen as proper and in satisfaction of 35 USC § 103. As such the rejections are seen as proper and are thus maintained.

4. On page 16 of the Remarks, the Applicants traverse the rejections of claims 8, 16 and 23. Specifically the Applicants argue that even if Sakita and APA were combined it would not result in a pair of waveforms where the voltages are floated to different intervals of time.

The Examiner must respectfully disagree. As expressly stated in the rejections, the first waveform disclosed by APA is without question floated for a substantial period of time. The second waveform is floated for no interval of time. Thus it should be clear that there are different intervals of time which the waveforms are floated. As such the rejections are seen as proper and are maintained.

5. On page 17 of the Remarks, the Applicants traverse the rejection of claims 10, 18 and 25. Specifically the Applicants argue that the APA waveforms do not disclose rising voltages of different slopes.

The Examiner again respectfully disagrees. As evidenced by claim 30, the Applicants do not intend claims 10, 18 and 25 to be limited to non-zero slopes. As expressly discussed in the below rejections the APA waveforms clearly have different slopes.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 16 recites the limitation "the initial sub-field" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 5-8, 10, 12-14, 16, 18, 21-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakita et al. (US 6,545,423) in view of Applicant's Admitted Prior Art (hereinafter, APA).

7. Claim 16 recites the limitation "the initial sub-field" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 5-8, 10, 12-14, 16, 18, 21-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakita et al. (US 6,545,423) in view of Applicant's Admitted Prior Art (hereinafter, APA).

With respect to claim 1, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 31, for example) to a sustain electrode (row electrode X in fig. 13) during a first time interval (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF4 in fig. 31) of one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during a second timer interval (preparation period TR) of all or fewer than all of the remaining sub-fields (SF1,2,3,p all have TR1) following the initial sub-field, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

With respect to claim 1, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 31, for example) to a sustain electrode (row electrode X in fig. 13) during a first time interval (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF4 in fig. 31) of one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during a second timer interval (preparation period TR) of all or fewer than all of the remaining sub-fields (SF1,2,3,p all have TR1) following the initial sub-field, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during a first time interval that is a portion of the set-up interval (Td in fig. 5); such that the sustain electrode is electrically floated in the first waveform during the first time interval

that is a portion of the set-up interval (fig. 5; page 6, line s4 – page 8, line 11 of the current specification), and

applying a second waveform to a sustain electrode during a second time interval that is a portion of the set-up interval (Z electrode pulse in fig. 3), such that the sustain electrode is supplied with substantially a ground voltage in the second waveform during the second time interval that is a portion of the set-up interval of all or fewer than all of the remaining sub-fields (fig. 3, page 4, lines 1-21 of the current specification).

Sakita and APA are analogous art because they are both from the same field of endeavor namely, driving waveforms for plasma display devices.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita.

Furthermore it would have been obvious to one of ordinary skill in the art to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

To further explain the combination, Sakita discloses, applying one type of initialization waveform to one subfield (SF4 in fig. 31) of a frame and a separate distinct initialization waveform to the rest of the subfields (SF1 etc. in fig. 31) of the frame. The Applicant is also pointed to the fact that the addressing waveforms are identical from one subfield to the next, likewise the sustain waveforms are only altered from one subfield to the next due to the differences in luminance of the subfield. Finally and most

telling, Sakita discloses that the initialization waveform of each subfield is dependent upon the weight (or brightness) of luminance of the subfield (col. 14, lines 63-67).

By Applicant's admission the waveforms of figures 3 and 5 have been known in the art prior to the Applicant's invention. Also known is that the initialization waveform of figure 5 provides for increased contrast, but is hampered by the fact that misfires occur in high brightness subfields. Finally it is also disclosed by the Applicant that it was previously known in the art that the initialization waveforms of figure 3 are not susceptible to brightness misfires in high brightness subfields, but lack the improved contrast quality of the figure 5 waveforms.

Thus it seems clear to the Examiner that it would have been obvious to one of ordinary skill in the art to combine the two teachings to create a plasma display device having improved contrast, as well as, protection against misfires in high brightness subfields.

With respect to claim 5, Sakita and APA disclose, the method as claimed in claim 1 (see above).

Sakita, when combined with APA, discloses the set-up interval is for forming wall charges within on rot more cells by a writing discharge, and the set-down interval is for erasing a portion of said wall charges by an erasure discharge (APA; clear from fig. 5; also see page 6, line 4 – page 8, line 11 of the current specification).

With respect to claim 6, Sakita and APA disclose, the method as claimed in claim 5 (see above).

Sakita, when combined with APA, discloses wherein wall charges within one or more cells are formed by a writing discharge during the set-up interval in each initialization period (APA; fig. 3) of the remaining sub-fields other than the initial sub-field, and wherein the set-down interval in each initialization period of the remaining sub-fields a portion of said wall charges are erased by an erasure discharge (APA; also see page 4, lines 1-21 of the current specification).

With respect to claim 7, Sakita and APA disclose, the method as claimed in claim 1 (see above).

Sakita, when combined with APA, discloses wherein the sustain electrode is are electrically floated during a shorter time than said first time interval in the set-up interval (APA; seems clear from a comparison between fig. 3 and fig. 5, that the sustain electrode is floated for a shorter time in the fig. 3, sub-field.).

With respect to claim 8, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 31, for example) to a sustain electrode (row electrode X in fig. 13) during a first time interval (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF4 in fig. 31) of one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during a second timer interval (preparation period TR) of all or fewer than all of the remaining sub-fields (SF1,2,3,p all have TR1) following the initial sub-field, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during the set-up interval (Td in fig. 5) in an initial sub-field of one frame; such that the sustain electrode is electrically floated in the first waveform during the set-up interval (fig. 5; page 6, line s4 – page 8, line 11 of the current specification), and

applying a second waveform to a sustain electrode during the set-up interval (Z electrode pulse in fig. 3) of all or fewer than all of the remaining sub-fields, wherein a time interval when the sustain electrode is floated in the second waveform is set to be shorter than a time interval during which the sustain electrode is floated in the first waveform (fig. 3, page 4, lines 1-21 of the current specification).

It should first be noted that as currently worded it is not required that the second waveform be floated at all. This is possible due to the broad language stating that the waveform is floated during a set-up interval of "all or fewer than all of the remaining sub-

fields." This limitation includes none of the remaining sub-fields, and as such the second waveform would not be floated at all.

However, the replacement of the reset period of this second waveform with the initialization period of the APA's figure 3, clearly ensures that a time interval when the sustain electrode is floated is set to be shorter as it goes into the last sub-field of a frame. In the case of figure 3, the time interval becomes zero.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita.

Furthermore it would have been obvious to one of ordinary skill in the art to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

With respect to claim 10, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 31, for example) to a sustain electrode (row electrode X in fig. 13) during a first time interval (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF4 in fig. 31) of one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during a second timer interval (preparation period TR) of all or fewer than all of the remaining sub-fields (SF1,2,3,p all have TR1) following the initial sub-field, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during the set-up interval (Td in fig. 5) in an initial sub-field of one frame; and

applying a second waveform to a sustain electrode during the set-up interval (Z electrode pulse in fig. 3) of all or fewer than all of the remaining sub-fields;

wherein the first waveform is different from the second waveform, such that a voltage rising at a first slope is applied to the sustain electrode during said first waveform (fig. 5), and a voltage rising at a second slope (zero slope in fig. 3) different from the first slope is applied to the sustain electrode during said second waveform (again compare figs. 3 and 5).

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita.

Furthermore it would have been obvious to one of ordinary skill in the art to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

With respect to claim 12, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 33, for example) to a sustain electrode (row electrode X in fig. 13) during a first time interval (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF2,3 in fig. 33) having a low weighting value at one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during a second time interval (preparation period TR) of all or fewer than all of the of the remaining sub-fields (SF1,2,3,p all have TR1) other than the initial sub-field having said low brightness weighting value, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during a first time interval that is a portion of the set-up interval (Td in fig. 5); such that the sustain electrode is electrically floated in the first waveform during the first time interval that is a portion of the set-up interval (fig. 5; page 6, line s4 – page 8, line 11 of the current specification), and

applying a second waveform to a sustain electrode during a second time interval that is a portion of the set-up interval (Z electrode pulse in fig. 3), such that the sustain electrode is supplied with substantially a ground voltage in the second waveform during the second time interval that is a portion of the set-up interval of all or fewer than all of the remaining sub-fields (fig. 3, page 4, lines 1-21 of the current specification).

Sakita and APA are analogous art because they are both from the same field of endeavor namely, driving waveforms for plasma display devices.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita. Furthermore it would have also been obvious to one of ordinary skill to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

Please note the above discussion in claim 1, further clarifying the combination.

With respect to claim 13, Sakita and APA disclose, the method as claimed in claim 12 (see above).

Sakita further disclose, wherein said sub-field having said low brightness weighting value includes at least one sub-field having a brightness weighting value that is less than a half of the maximum brightness weighting value of said frame (seems clear from simply judging the lengths of the sustain periods that SF2 is less than half of SFp in fig. 33).

With respect to claim 14, as this claim is sufficiently similar to the limitations of claim 5, claim 14 is rejected on the same merits shown above in claim 5.

With respect to claim 16, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 33, for example) to a sustain electrode (row electrode X in fig. 13) during the set-up interval (preparation period TR; col. 14, lines 63-65) of a sub-field (SF3 in fig. 33) having a low brightness weighting value (SF3 and SF2 in fig. 33; for example) at one frame (Tsf in fig. 33); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during the set-up interval (preparation period TR) of all or fewer than all of the of the remaining sub-fields (SF1,2,3,p all have TR1) other than the initial sub-field having said low brightness weighting value, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during the set-up interval (Td in fig. 5) in an initial sub-field of one frame; such that the sustain electrode is electrically floated in the first waveform during the set-up interval (fig. 5; page 6, line s4 – page 8, line 11 of the current specification), and

applying a second waveform to a sustain electrode during the set-up interval (Z electrode pulse in fig. 3) of all or fewer than all of the remaining sub-fields, wherein a time interval when the sustain electrode is floated in the second waveform is set to be shorter than a time interval during which the sustain electrode is floated in the first waveform (fig. 3, page 4, lines 1-21 of the current specification).

It should first be noted that as currently worded it is not required that the second waveform be floated at all. This is possible due to the broad language stating that the waveform is floated during a set-up interval of "all or fewer than all of the remaining sub-

fields." This limitation includes none of the remaining sub-fields, and as such the second waveform would not be floated at all.

However, the replacement of the reset period of this second waveform with the initialization period of the APA's figure 3, clearly ensures that a time interval when the sustain electrode is floated is set to be shorter as it goes into the last sub-field of a frame. In the case of figure 3, the time interval becomes zero.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita.

Furthermore it would have been obvious to one of ordinary skill in the art to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

With respect to claim 18, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 33, for example) to a sustain electrode (row electrode X in fig. 13) during the set-up interval (preparation period TR; col. 14, lines 63-65) of a sub-field (SF3 in fig. 33) having a low weighting value (SF3 and SF2 in fig. 33; for example) at one frame (Tsf in fig. 33); and

applying a second waveform (TR1 in fig. 31; for example) to a sustain electrode during the set-up interval (preparation period TR) of all or fewer than all remaining sub-fields (SF1,2,3,p all have TR1) other than the initial sub-field having said low weighting

value, wherein the first waveform is different from the second waveform (col. 18, lines 6-16).

Sakita does not expressly disclose, applying rising and falling pulses to a scan electrode, nor does Sakita disclose set-up and set-down intervals.

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA discloses, applying a rising pulse to a scan electrode during a set-up interval of an initialization period, wherein the rising pulse changes to a second voltage after the rising pulse has changed to a first voltage, wherein the second voltage is higher than the first voltage (Y electrode waveform in fig. 5);

applying a falling pulse to a scan electrode during a set-down interval of the initialization period, wherein the falling pulse changes to a fourth voltage after the falling pulse has changed to a third voltage, wherein the third voltage is higher than the fourth voltage (Z electrode in fig. 5).

APA further discloses, applying a first waveform to a sustain electrode during the set-up interval (Td in fig. 5) in an initial sub-field of one frame; and

applying a second waveform to a sustain electrode during the set-up interval (Z electrode pulse in fig. 3) of all or fewer than all of the remaining sub-fields;

wherein the first waveform is different from the second waveform, such that a voltage rising at a first slope is applied to the sustain electrode during said first waveform (fig. 5), and a voltage rising at a second slope (zero slope in fig. 3) different from the first slope is applied to the sustain electrode during said second waveform (again compare figs. 3 and 5).

It should first be noted that as currently worded it is not required that the second waveform be floated at all. This is possible due to the broad language stating that the waveform is floated during a set-up interval of "all or fewer than all of the remaining sub-fields." This limitation includes none of the remaining sub-fields, and as such the second waveform would not be floated at all.

However, the replacement of the reset period of this second waveform with the initialization period of the APA's figure 3, clearly ensures that a time interval when the sustain electrode is floated is set to be shorter as it goes into the last sub-field of a frame. In the case of figure 3, the time interval becomes zero.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita.

Furthermore it would have been obvious to one of ordinary skill in the art to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

With respect to claim 21, Sakita discloses, a method of driving a plasma display panel, comprising:

applying a first waveform (TR2 in fig. 33, for example) to one or more sustain electrodes (row electrode X in fig. 13) in an initialization period (preparation period TR; col. 14, lines 63-65) included in an initial sub-field (SF4 in fig. 31) of one frame (Tsf in fig. 31); and

applying a second waveform (TR1 in fig. 31; for example) to the one or more sustain electrodes in an initialization period (preparation period TR) of all or fewer than all of the remaining sub-fields (SF1,2,3,p in fig. 31 all have TR1) following the initial sub-field of said frame; wherein the second waveform is different from the first waveform (col. 18, lines 6-16).

Sakita does not expressly disclose a set-up or a set-down interval or that the waveforms are applied during such an interval. Furthermore Sakita does not expressly disclose electrically floating a sustain electrode during the first waveform.

APA discloses, a method of driving a plasma display panel, comprising:

a first and second waveform (figs. 5 and 3) which contain an initialization period which includes a set-up interval for forming wall charges within at least one cell by a writing discharge, and a set-down interval for erasing a portion of said wall charges by an erasure discharge (see page 4, lines 1-21 of the current specification); wherein one or more sustain electrodes are electrically floated during a first time interval that is a portion of the set-up interval and wherein the second waveform is different from the first

waveform and is applied during a second time interval that is a portion of said set-up interval (also see page 6, line 4 – page 8, line 11 of the current specification).

Sakita and APA are analogous art because they are both from the same field of endeavor namely, driving waveforms for plasma display devices.

At the time of the invention it would have been obvious to one of ordinary skill in the art to supply the scan electrode pulses taught by APA to the panel of Sakita. Furthermore it would have also been obvious to one of ordinary skill to apply waveforms during to a sustain electrode during a portion of a set-up interval.

The motivation for doing so would have been increased contrast and less chance of brightness misfires (APA; page 6, lines 8-10).

To further explain the combination, Sakita discloses, applying one type of initialization waveform to one subfield (SF4 in fig. 31) of a frame and a separate distinct initialization waveform to the rest of the subfields (SF1 etc. in fig. 31) of the frame. The Applicant is also pointed to the fact that the addressing waveforms are identical from one subfield to the next, likewise the sustain waveforms are only altered from one subfield to the next due to the differences in luminance of the subfield. Finally and most telling, Sakita discloses, that the initialization waveform of each subfield is dependent upon the weight (or brightness) of luminance of the subfield (col. 14, lines 63-67).

By Applicant's admission the waveforms of figures 3 and 5 have been known in the art prior to the Applicant's invention. Also known is that the initialization waveform of figure 5 provides for increased contrast, but is hampered by the fact that misfires occur in high brightness subfields. Finally it is also disclosed by the Applicant that it

was previously known in the art that the initialization waveforms of figure 3 are not susceptible to brightness misfires in high brightness subfields, but lack the improved contrast quality of the figure 5 waveforms.

Thus it seems clear to the Examiner that it would have been obvious to one of ordinary skill in the art to combine the two teachings to create a plasma display device having improved contrast, as well as, protection against misfires in high brightness subfields.

With respect to claim 22, Sakita and APA disclose, the method of claim 21 (see above).

APA further discloses, wherein the second waveform (fig. 3) supplies the one or more sustain electrodes with substantially a ground voltage during the set-up interval of all or fewer than all of the remaining sub-fields (also see page 4, lines 1-21 of the current specification).

With respect to claim 23, Sakita and APA disclose, the method of claim 21 (see above).

Sakita, when combined with APA, discloses wherein the second waveform allows the one or more sustain electrodes to be electrically floated during a shorter time than the one or more sustain electrodes that are allowed to be electrically floated when the first waveform is applied during said first time interval in the set-up interval of the initial subfield (APA; seems clear to the Examiner that the fig. 3 waveform is floated for a shorter time (in this case, not at all) than the fig. 5 waveform that is floated for a defined period of time).

With respect to claim 24, Sakita and APA disclose, the method of claim 21 (see above).

Sakita, when combined with APA, discloses wherein the first waveform (APA; fig. 5) allows the one or more sustain electrodes to have a voltage rising at a first slope during said first time interval in the set-up interval of the initial sub-field (APA; clear from fig. 5).

With respect to claim 25, Sakita and APA disclose, the method of claim 21 (see above).

Sakita, when combined with APA, discloses wherein the second waveform (APA; fig. 3) allows the one or more sustain electrodes to have a voltage rising at a second slope different than a first slope of a voltage rising for the one or more sustain electrodes generated by the first waveform (APA; clear from fig. 3 that the slope of the waveform in the second waveform is 0, which is different than the non-zero slope shown in fig. 5).

With respect to claims 26 and 31, Sakita and APA disclose, the method as claimed in claims 8 and 16 (see above).

Sakita, when combined with APA, discloses wherein the second waveform has a lower peak voltage than the first waveform as a result of said shorter time interval (APA; zero voltage is clearly lower than the voltage floated in fig. 5).

With respect to claim 27, Sakita and APA disclose, the method as claimed in claim 8 (see above).

Sakita, when combined with APA, discloses wherein the first and second waveforms have substantially a same slope (APA; both have a zero slope element within the waveforms).

With respect to claim 28, Sakita and APA disclose, the method as claimed in claim 10 (see above).

Sakita, when combined with APA, discloses wherein the first slope is greater than the second slope (APA; any slope is greater than zero slope).

With respect to claim 29, Sakita and APA disclose the method as claimed in claim 28 (see above).

Sakita, when combined with APA, discloses wherein the voltage rising at the first slope has a maximum peak voltage (APA; max during Td in fig. 5) greater than a maximum peak voltage of the voltage rising at the second slope (APA; 0 volts in fig. 3).

10. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakita et al. (US 6,545,423) in view of Applicant's Admitted Prior Art (hereinafter, APA) and further in view of Matsumoto et al. (US 5,854,540).

With respect to claim 2, Sakita and APA disclose, the method as claimed in claim 1 (see above).

Neither Sakita nor APA expressly disclose, wherein said initial sub-field is at least one sub-field including the first sub-field of said frame.

Matsumoto discloses, wherein said initial sub-field is at least one sub-field including the first sub-field of said frame (first sub-frame is the LSB sub-frame (clear in fig. 13; aka 5th embodiment), as discussed in the 6th embodiment).

Sakita, APA and Matsumoto are analogous art because they are all from the same field of endeavor namely sustain electrode waveforms for plasma display devices.

At the time of the invention it would have been obvious to order and apply the different initialization waveforms of Sakita and APA to the subfields as taught by Matsumoto.

The motivation for doing so would have been decrease the number of priming pulses and enhancing the contrast without appreciable degradation in the quality of the image (Masumoto; col. 25, lines 45-47, 57-58).

With respect to claim 3, Sakita, APA and Matsumoto disclose, the method as claimed in claim 2 (see above).

Matsumoto further discloses, wherein said initial sub-field is the first and second sub-fields of said frame (fig. 13 shows the order of the sub-fields, col. 25, lines 10-11 confirms that the second sub-field is indeed the sub-field that succeeds the first sub-field of the frame).

With respect to claim 4, Sakita and APA disclose, the method as claimed in claim 1 (see above).

Neither Sakita nor APA expressly disclose, wherein each of the remaining sub-fields other than the initial sub-field has a higher brightness weighting value than the initial sub-field.

Matsumoto discloses, wherein each of the remaining sub-fields other than the initial sub-field has a higher brightness weighting value than the initial sub-field (clear

from fig. 13, that the higher brightness weighting values, i.e. 2^2, 2^5, succeed the initial sub-field).

Sakita, APA and Matsumoto are analogous art because they are all from the same field of endeavor namely sustain electrode waveforms for plasma display devices.

At the time of the invention it would have been obvious to order and apply the different initialization waveforms of Sakita and APA to the subfields as taught by Matsumoto.

The motivation for doing so would have been decrease the number of priming pulses and enhancing the contrast without appreciable degradation in the quality of the image (Masumoto; col. 25, lines 45-47, 57-58).

11. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakita et al. (US 6,545,423) in view of Applicant's Admitted Prior Art (hereinafter, APA) and further in view of Kishi et al. (US 6,836,261).

With respect to claim 30, Sakita and APA disclose, the method as claimed in claim 10 (see above).

Neither Sakita nor APA expressly disclose, wherein the first slope and the second slope are non-zero slopes.

Kishi discloses, a variable sloped reset waveform (fig. 9; fig. 10b) for a plasma display panel, the waveform comprising a voltage which rises at a first and second slope (col. 8, lines 24-64).

Kishi, Sakita and APA are all analogous art because they are all from the same field of endeavor namely plasma display panel waveform design.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace zero slope reset period of APA and Sakita with the adjustable sloped reset waveform disclosed by Kishi.

The motivation for doing so would have been to improve the driving voltage margin and increase the display quality (Kishi; col. 4, lines 60-65).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William L. Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wlb
12/10/07

Sumati Lefkowitz

SUMATI LEFKOWITZ
SUPERVISORY PATENT EXAMINER